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Physiological Factors in the Condition of "Dry Coat" in Horses

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Origin of the Investigation

THIS concerted study of the dry-coat condition arose out of originally separate investigations, on the one hand by D. F. G. S. & C. L. E. at Porton on the physiology of sweating in the normal horse in England, and on the other hand by K. A. Ross at Penang on the state of dry coat in horses in Malaya. Through the intermediation of R. S. T. Bowden, of Ipoh, Malaya, who, at the suggestion of D. F. G. S., carried out some of the earlier experiments on dry coat, the two investigations were brought into contact, after which the work in Malaya was carried out by K. A. Ross between whom and the Porton team close contact by correspondence was maintained throughout.

As explained later, Dr. G. B. West & Dr. H. Weil-Malherbe, as experts in their respective fields, carried out examinations of materials sent by K. A. Ross.

Introduction

The condition of "dry coat," "non-sweating" or anhidrosis in horses has long been recognised (Wright & Tull, 1925 ; Macgregor, 1935). It rarely occurs in temperate or hot dry climates, but regularly in a proportion of Australian (Waler) and British Thoroughbreds of either sex imported into hot wet climates from cool ones ; it sometimes occurs in Indian countrybreds containing Thoroughbred blood but seldom in the indigenous horses of hot and humid countries. It does not affect Arab horses moved from hot and dry to hot and humid climates for racing. It is met with in parts of India, Malaya, Ceylon, the Philippines, West Indies and Indonesia. It is rare in South Africa and in Australia. On removal to cooler and drier climates the condition is often improved in from 10 to 30 days.

Dry coat is especially prone to occur in imported Thoroughbreds during or following the period of acclimatisation : it is not related to sex or colour, but is more prevalent in highly-strung animals. The conditions under which race-horses work, and the high protein diet they receive, render them rather more susceptible than imported Waler or British horses used for polo.

The condition is preceded by excessive sweating, raised pulse rate, abnormal "blowing" after exercise or even at rest, accompanied by dilatation of nostrils ; if the animal does not settle down and acclimatise the profuse sweating is followed by restriction of the areas of sweating to under the jowl, along the neck and at the base of the ears, between hind legs and under the saddle. As the condition progresses, even these areas show reduction and, in places, finally suspension of sweating. In the great majority of cases in Malaya the onset of dry coat is very gradual, and even in extreme cases there is an ability to sweat slightly, especially along the mane. The areas totally dry after exercise begin where the skin is most closely adherent to the underlying tissues, *e.g.*, over the rump and gluteal muscles and spreading to the flanks and ribs, so that there is a patchy appearance after exercise. There is in advanced cases increase of general scurfiness and inelasticity of the skin and the hair tends to fall out. Usually these animals cease to be useful for racing or polo, or if they continue, suffer much from sustained panting even at rest, and may die from cardiac collapse during or just after a race or chukker. Usually the animals lose bodily condition and become unthrifty ; the systolic blood pressure is high and the pulse accelerated. The body temperature is raised, even at rest, and

in exercise may reach 105° to 108° F. After a gallop there is vascular engorgement of the skin. Slight exercise is enough to provoke severe dyspnoea and tachypnoea (rate up to 150). Kidney action is increased (polyuria) to compensate for reduced sweating (Arnold, 1950) and the urine may contain albumin and casts.

It has been stated that after exercise the high temperature is maintained for several hours (Stewart, 1938), but Ross has made over 200 observations on dry-coated and free-sweating horses performing the same work at the same time and under identical conditions, and has found that the rectal temperatures of the dry-coated animals took exactly twice as long to return to normal as did those of the free sweaters : this time ratio remained constant irrespective of the rise of temperature or the amount of work done and irrespective of the degree of " dryness " of the animal. In only two cases of dry-coated animals did the temperature remain high and in both cases a febrile condition followed on.

Another aspect of the regulating mechanism is seen in what is described as the " delayed " or " suppressed " sweater. In this type of animal there is no sign of sweating on returning from exercise and often little distress. After a period of time varying from five minutes to over an hour the animal will suddenly break out into a sweat and then behave as a normal free sweater. Such animals invariably eventually become dry and the phenomenon of suppressed sweating is probably a preliminary stage. In normal horses an analogous phenomenon is sometimes seen in " breaking out " which occurs after drying off following exercise.

The condition has been variously ascribed to infection with a specific organism (Wright & Tull, 1925), to use of arsenic as a tonic by trainers in India (Stewart, 1938), to thyroid deficiency (MacGregor, 1935) to upset of blood-salt balance (Barnes, 1938), to disturbance of water balance (Arnold, 1950), to lack of vitamin C, or of NaCl, to hypofunction of adrenal cortex (Wallace, 1938) ; also to lack of potassium, or of vitamin B, inadequacy of adrenal medulla, etc. ; low blood NaCl has been described (Gilyard, 1944). Findings of loss of coat colour, anaemia, cirrhosis, glomerulonephritis, jaundice, necrotic stomach lining and poor appetite are probably explicable as due to mild chronic arsenical poisoning.

Atrophy of the sweat glands has been described by Wright & Tull (1925) and by Stewart (1938), but this has not been an invariable finding, since others (Barnes, 1938) find them normal.

Post-mortem examination gives no findings attributable to the condition.

After a period of rest, with reduction in the calorific value of the diet some sweating may reappear transitorily on exercise, but, with increasing work, ceases again.

If returned to the hot damp climate after recovery in the cool, some horses sweat profusely day and night for five to six days, and then gradually, within three weeks, go dry again (Barnes, 1938). Long-standing cases of non-sweating, *e.g.*, two to three years, may not recover in cooler climates (Barnes). Some cases are intermittent.

Little pharmacology has been done. Barnes found that " Padutin " (Bayer) a vaso-dilator substance probably identical with kalikrein, did not re-establish sweating. Wallace found that adrenaline 4 c.c. subcutaneously produced sweating, followed for some time by increased local anhidrosis ; but after five weeks the area sweated normally again.

As regards treatment, Arnold found that antihistamine preparations rapidly relieved the distressing panting symptoms ; Stewart, Arnold & Gilyard reported temporary improvement in the condition of the coat and sweating in some horses after saline solutions administered by stomach tube or intravenously. Wallace found that vitamin B and C supplements in the feed improved the general appearance of the skin and coat of some cases but did not appreciably increase sweating.

The Physiological Aspects of Sweating in the Horse

The physiological function of sweat is the regulation of body temperature by its evaporation. This utilises the latent heat of evaporation of water, which at 40° C. is 574 cal. per g. This means that the evaporation of a litre of sweat would lower the temperature of a horse weighing 400 kg. and of specific heat of tissues = 0·8, somewhere about 1·8° C. or 3·2° F., *i.e.*, 300 c.c. sweat, *if evaporated*, would lower the temperature 1° F.

The other means of cooling the body are by radiation, convection and conduction from the skin, and by heat loss from the lungs by warming the air and evaporating water. In a cool dry climate it is probable that some 30 per cent. of the heat is lost by evaporation, even at rest : after exercise the figure would be raised considerably.

In a hot dry environment loss of heat by radiation, convection and conduction is much reduced : when the surrounding temperature reaches 100° F. no heat loss is possible by these routes, but evaporation is still adequate to keep the body temperature normal, provided the animal can sweat.

As the relative humidity is increased, the effect of evaporative cooling becomes less, and at saturation point is nil. Under humid tropical conditions, therefore, say 80° F. and 80 relative humidity, body heat is lost with difficulty and at first sweating is likely, even at rest, but much of the sweat would run off and be ineffective. Exercise, or diets rich in fat or protein, by raising the heat production, will further increase the difficulty of regulating the body temperature. Hence the profuse sweating and the increase of breathing when at rest, or on slight exertion.

The regulation of body temperature is effected through nervous centres in the hypothalamus which respond as thermoregulators to changes in the temperature of the blood, one centre to cooling and one to heating. When the temperature rises the heat centre sets in action such responses as will lower it ; these are especially a flushing of the skin encouraging heat loss by radiation and convection, and sweating, which, if the sweat evaporates on the skin, will improve heat loss by evaporation. In man, sweating is brought about by the action of sympathetic nerves, ultimately under the control of the hypothalamic centres, and most of our knowledge of sweating relates to the study of these eccrine glands in man and in the pads of the feet in the cat. The horse, however, is provided with apocrine glands only, and these, unlike the eccrine glands, are adrenergic, *i.e.*, they respond to adrenaline. Intra-

venous injection of 0·5 to 1·0 mg. of adrenaline is enough to cause profuse sweating in a normal adult horse in England. Present evidence indicates that increase in blood adrenaline is the normal mechanism by which sweat secretion is produced in the horse, and that sympathetic nerve impulses to the skin are not concerned with sweat secretion (as they are in the eccrine glands) and, at most, only affect sweat secretion by causing changes in the blood supply to the skin (Lovatt Evans & Smith, 1956 ; Lovatt Evans, Smith & Weil-Malherbe, 1956 ; Bell & Lovatt Evans, 1956 (*a*) and (*b*)). When a normal horse is exercised, there is a release of adrenaline from the adrenals, leading to such increase in the adrenaline content of the circulating blood as is adequate to cause general sweating.

From these facts an explanation of the causation of dry coat could be made on the following lines. The hypothalamic heat-regulating centres are " set " to maintain a steady normal body temperature, and acclimatisation to a new environment consists in such adjustments as will preserve this constancy. In a hot climate, one of the anticipated immediate adjustments in the horse would be a permanent rise of blood adrenaline, thus causing sweating to be constant or at least near threshold point. This would continue to be adequate for homoiostasis, but for the fact that in some individuals (and potentially in all) many of the sweat glands become accommodated to a raised blood adrenaline level and cease to respond unless it is increased still further. The heat regulating centres are then as it were " set " to a higher body temperature, much as happens in some febrile states, and ultimately the sweat glands become almost unresponsive to adrenaline.

It follows from this that failure to sweat on exercise would be due fundamentally to displacement of the " setting " of the hypothalamic thermal control centres. This brings about the failure of sweating by one or more of the following means :—

(i) Exhaustion of adrenaline stores in the adrenal medulla.

(ii) Failure of the adrenals to release adrenaline into the blood ; this would cause an ultimate *lowering* of blood adrenaline level.

(iii) Restriction of blood supply to the skin, hence restricted access of circulating adrenaline to the skin.

(iv) Lowered responsiveness of the sweat glands to adrenaline.

(v) Degeneration or other structural changes in the sweat glands.

Of these possibilities (i) can be assessed by analysis of the adrenals, (ii) by assay of blood adrenaline before and after exercise, (iv) by studying the response to intravenous injection, and the local response to intradermal injection, of adrenaline, and (v) by histological examination. All except (iii), for which we have no evidence to offer, have been explored in the present investigation.

Methods

The non-sweating race-horses, and some normals, were studied mainly by K. A. Ross at Penang ; a few experiments were done by R. S. T. Bowden at Ipoh. The normals in England were studied by Lovatt Evans & Smith at Porton.

For examination of the adrenals, horses were slaughtered by humane killer, the adrenals removed, placed in 0·01 or 0·1 N . HCl, flown to Great Britain, and assayed by G. B. West by the biological method and by chromatography.

Determinations of blood adrenaline were made by drawing aseptically 15 ml. of blood from the jugular vein into 5 ml. of a sterile solution containing 1 g. sodium ethylene diaminetetracetate (at *p*H 7) and 2 g. sodium thiosulphate per 100 ml. The mixture was centrifugalised for 10 minutes at 1,500 r.p.m., and the plasma drawn off aseptically, all by Ross. The samples were packed in ice, flown to London Airport, met there and taken (still cold) by road to Runwell Hospital, to be analysed by Weil-Malherbe by the method of Weil-Malherbe & Bone (1953). This took about five days in all from sampling to completion.

Histological specimens of skin were fixed in Malaya in formol saline or picric alcohol formol by Ross, flown to Britain and examined histologically by Mrs. A. M. Nisbet, of the Hannah Dairy Research Institute, Kirkhall, Ayr, Scotland. Some specimens of normal skin were fixed at Porton. The results of the histological examinations will be published later.

Examination of the responses of normal, and of dry coat, horses in Malaya to adrenaline were made by intradermal or intravenous injection, mainly by Ross, using the methods employed by Lovatt Evans & Smith (1956).

Results

The Adrenaline Content of the Adrenals

In normal British farm horses West (1953) found the whole adrenal cortex plus medulla to contain on the average

Adrenaline 666 μg. per g. fresh tissue
Noradrenaline 166 μg. per g. fresh tissue
} Relative noradrenaline per cent. = 9 to 25 per cent. of total.

A race-horse, " Dendrite," aged eight, which had been almost totally dry-coated for the last three years, was slaughtered on May 19th, 1955 (Ross). The assay (G. B. West) showed :—

Adrenaline 408 μg. per g. fresh tissue
Noradrenaline 91 μg. per g. fresh tissue
} Relative noradrenaline per cent. = 20.

A second dry-coated race-horse, " Zatopek " (gelding, six years ; resident in Malaya three years, dry for two years) was killed on June 20th, 1956. One of the adrenals was atrophic ; Dr. West found, for the two adrenals :—

Adrenaline 834 μg. per g. tissue
Noradrenaline 83 μg. per g. tissue
} Relative noradrenaline per cent. = 9.

The results show the relation between the two catechol amines to be within the normal range, though the total amount in " Dendrite " was below the average. So far as these cases go there would appear to be no grounds for supposing that lack of adrenaline in the adrenals was responsible for the absence of sweating ; some of the

catechols might have been lost in transit, but even if this were not so, the amounts actually found would unquestionably be adequate to release into the circulation enough adrenaline to cause prolonged and abundant sweating in a normally disposed horse.

The Adrenaline Content of the Blood

Experiments by Lovatt Evans, Smith & Weil-Malherbe (1956) have shown that the adrenaline content of the plasma in 32 experiments on 11 hunters in England averaged, when at rest, 1·69 μg. per litre (range 1·10 to 4·04). A minute or two after a canter varying from 19 to 65 minutes, and sufficient to cause free sweating, the content in 11 experiments on seven horses averaged 3·45 μg. per litre (range 1·26 to 12·90); this was reduced to about half 20 minutes later. The noradrenaline content of the plasma was also about doubled by the exercise (means 4·48 μg. per litre before and 9·40 μg. per litre after), but noradrenaline does not cause sweating, and the increase is of unknown significance.

In Malaya, free-sweating, partial dry coat and fully anhidrotic race-horses were similarly examined (Ross & Weil-Malherbe). All the horses were Thoroughbreds. The resting blood samples were taken either immediately before exercise, or between 5 and 6 p.m. before settling down for the night. The exercise samples were drawn between 6.30 and 8.30 a.m. Each horse was ridden for three furlongs at the trot, then at a canter for four furlongs, and finally walked 200 yards to stalls for immediate sampling. The Tables below give the results.

In view of breed differences in horses, direct comparisons of values between hunters in England and Thoroughbreds and Walers in Malaya might perhaps be open to question. Our results should have included Thoroughbreds in England, but these could not be obtained.

TABLE I

PLASMA ADRENALINE AND NORADRENALINE; FREE SWEATERS, BEFORE AND AFTER EXERCISE

Date	Age	Name	Sex	Residence	Origin	Meteor	Adrenaline μg/l.		Noradrenaline μg/l.	
							before	after	before	after
5.7.55		"Tawakal"	Gelding	1½ years	English	Rest 5 p.m. 85° F. RH 71	2·52	3·24	17·3	14·9
		"Harwood"	Gelding	20 months	Australian	Exercise 8 a.m. 75° F. RH 64	1·93	6·30	5·05	13·0
7.1.56.	4	A	Gelding			86° F. RH 80	2·65	1·25	1·67	9·6
	6	B	Mare				2·60	4·15	11·6	32·5
	4	G*	Gelding				1·11	6·20	3·85	17·8
	5	H*	Gelding				1·18	1·40	5·15	6·04
19.1.56.	5	"Bobsworth"	Gelding			75° F. RH 65	3·93	5·30	27·3	31·3
	7	"Soundwave"	Gelding				4·50	3·84	23·4	22·6
	5	"Pinner"	Gelding				5·45	8·05	11·4	19·4

* Profuse

TABLE II

PLASMA ADRENALINE AND NORADRENALINE. DRY COAT HORSES. BEFORE AND AFTER EXERCISE

Date	Name	Age	Sex	Residence years	Dry for years	Origin	Meteor	Adrenaline μg/l.		Noradrenaline μg/l.	
								before	after	before	after
5.7.55.	"Linkshir"		Gelding	3+	2+	English	85° F. RH. 71	3·40	2·46	6·02	29·8
	"Greet"		Mare	3	2	Australian		5·05	2·98	10·2	8·2
	"Dande Bay"	6	Gelding	3+	2+	English		7·1	4·3	12·5	7·1
	"Lord Dhoti"		Stallion	6+	3+	Australian		1·8	3·55	7·6	21·4
	"Ryegrass"		Gelding	3	2	English		2·85	4·2	4·7	8·2
7.1.56.	C	5	Gelding		2+		86° F. RH.80	2·30	1·68	9·6	10·3
	D	6	Gelding		2+			3·13	9·0	15·5	42·8
	E	5	Gelding		2+			2·30	4·42	6·1	15·3
	F	7	Gelding		3+			1·44	3·95	4·55	9·80
19.1.56.	"Motion Picture"		Gelding		1+		75° F RH.65	2·20	3·86	10·70	17·9
	"Scottish Minstrel"	6	Gelding		2			2·46	5·00	56·7	67·0
	"Windy Corner"	6			2			5·13	4·65	17·3	23·4
					Partially Dry						
5.7.55	"Fighting Finish"		Gelding	3	1½	English	85° F. RH. 71	2·12	2·44	6·80	5·60

Tables I and II show that for the horses in Malaya the mean values for adrenaline and noradrenaline before exercise were :—

		Mean µg/l.	S.D.	S.E. of mean
Free Sweaters	Adrenaline	2·87	1·48	0·49
	Noradrenaline	13·53	8·33	2·78
Dry Coats	Adrenaline	3·18	1·63	0·45
	Noradrenaline	12·94	13·73	3·81

The correlation between adrenaline and noradrenaline in all 22 horses before exercise is 0·613 which is highly significant at $P<0.01$ (20° of freedom).

Comparison of blood catechols in free sweaters before and after exercise shows that for adrenaline the mean difference before and after exercise was 1·54 µg. per litre and the S.E. of this mean difference was 0·724 µg. per litre. This gives $t = 2.13$ for 8° of freedom, and P lies between 0·05 and 0·1. The difference is thus marginally significant. For noradrenaline the mean difference = 5·04 µg. per litre : S.E. of mean difference = 2·89 ; $t_8 = 1.74$: P between 0·1 and 0·2, *i.e.*, the difference is not significant.

Similar calculations for dry-coat horses show, for adrenaline, mean difference = +0·862 µg. per litre S.E. mean difference 0·637 : $t_{12} = 1.35$: P = 0·20, *i.e.*, no significant difference. For noradrenaline, mean difference = +7·58 µg. per litre. S.E. mean difference =2·67 : $t_{12} = 2.84$: P between 0·01 and 0·02, *i.e.*, the difference is highly significant.

The Response to Intravenously Injected Adrenaline

Intravenous Injection.—In England, the intravenous injection of 1 mg. of L-adrenaline always caused free sweating. In Malaya (Ross) although 1 mg. produced sweating in free sweaters, the response was perhaps slightly less than in England for that dose, and 1·3 mg. was needed in one instance (" Flux ") and 2 mg. in another (" Indian Heather ") to produce normal very free sweating ; but the general picture was similar to that seen in England. (Fig. 1.)

The dry-coated horses, though none of them showed no response whatever, proved to be very much less sensitive, and always to respond less than the free-sweaters to adrenaline. A striking example was " What Happened," six-year gelding, dry for over three years. After 1 mg. adrenaline the appearance was similar to that after exercise, the only evidence of sweating being a few drops near the mane. Doses of 1·5 mg., 2 mg. and 2·5 mg. caused very slight sweating on neck, belly and perineum, but no free sweating anywhere (Fig. 2). A less severe case was " Pasamora," dry for over two years (Fig. 3). Exercise, or 1 mg. adrenaline intravenously, caused a little more dampness on neck, brisket and perineum, than in " What Happened," after 1·5 mg., and 1·5 mg. a little more than in " What Happened " after 2 mg., while 2 mg. even caused some free sweating over upper neck, brisket and perineum, and all the body sweated somewhat, except thigh and croup.

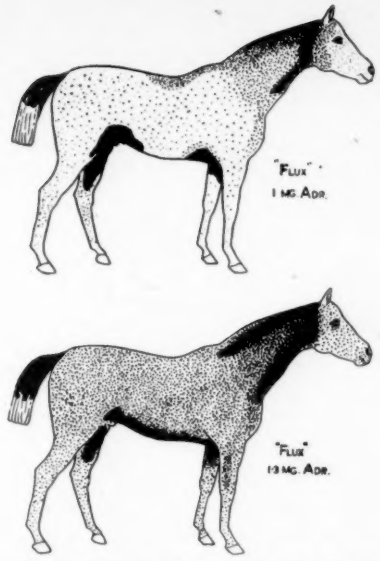


FIG. 1.—Typical response of a free-sweater to intravenous injection of adrenaline 10 minutes previously. " Flux," gelding, three years, newly arrived at Penang from England. The depth of stippling indicates the profuseness of the sweating, black being maximal streaming sweating. The shading on the tail denotes state of perineum and beneath tail. " Indian Heather," gelding, four years +, two years in Malaya, gave a very similar result.

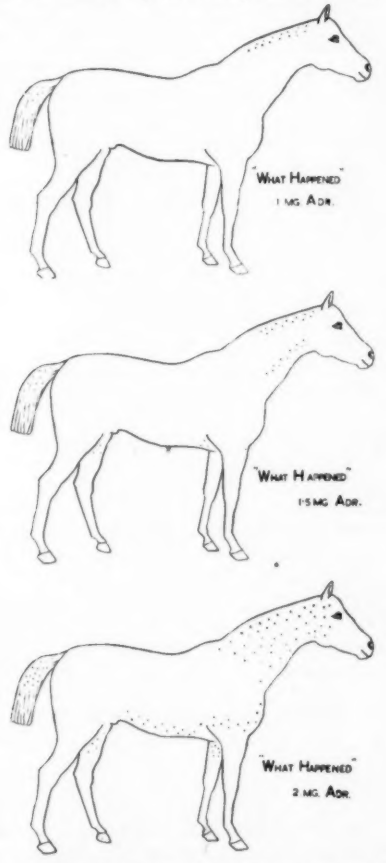


FIG. 2.—Response of a very bad case of dry-coat to intravenous adrenaline; " What Happened," six-year gelding, dry for over three years.

An interesting observation was that both these horses, "Pasamora" and "What Happened," subsequent to these injections, went totally dry for two weeks, producing no sweat whatever on exercise; after a further week the initial state of slight response was restored.

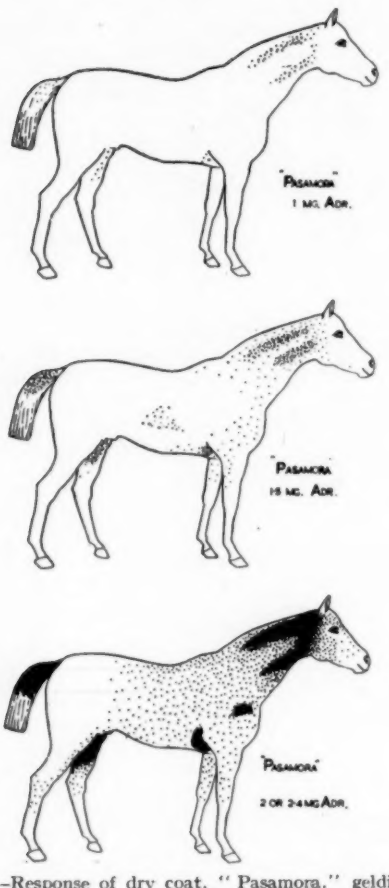


FIG. 3.—Response of dry coat, "Pasamora," gelding, six years, three years in Malaya, dry for two years.

"Motion Picture" (Fig. 4), dry for over two years, was in some respects a less severe case. Exercise, or 1 mg. adrenaline, caused slight sweating over a large area of neck, shoulder, belly and perineum; 1·5 mg. increased this to free sweating on parts of neck, and 2 mg. caused free sweating over all the areas mentioned, but no extenson of the areas previously affected by only 1 mg., the rest of the body being totally dry. This horse differed also in not subsequently going dry on the days following the injections.

Another dry-coated horse that failed to respond to 1 mg. adrenaline intravenously, or at most showed only slight traces of sweating near the line of the mane was "Khor Mousa," six-year gelding, three years in Malaya, and dry for over two and a half years.

These results show conclusively that the dry-coat horses in Malaya respond much less readily to intravenous adrenaline than do the free-sweaters. These last also seem to be a little less sensitive to adrenaline than are normal horses in England, but as the number examined was small the difference could not be insisted upon. With a normal horse in England, a dose of 1 mg. adrenaline caused free sweating over the whole body surface, but especially on neck and perineum. With the dry-coated horses it was found that the last areas to lose the response to adrenaline were the upper neck, brisket and perineum, and if any response was obtained at all, these areas sweated more than others. The first areas to go dry, *viz.*, the hind parts of the body (excluding perineal area), also showed the slightest response, and sometimes none whatever, even when fairly free sweating was seen on the neck.

The Response to Intradermal Adrenaline

Intradermal injections of 0·05 to 0·1 ml. adrenaline 10^{-3} to 10^{-6}* were made by Ross at various shaved areas of the skin. The most clear-cut results were obtained

*The notation 10^{-3}, etc. is used for brevity. 10^{-3} means a dilution of 1 in 10^3 : *i.e.* 1/1,000, 10^{-6} 1 in 10^6 or 1/1,000,000, etc.

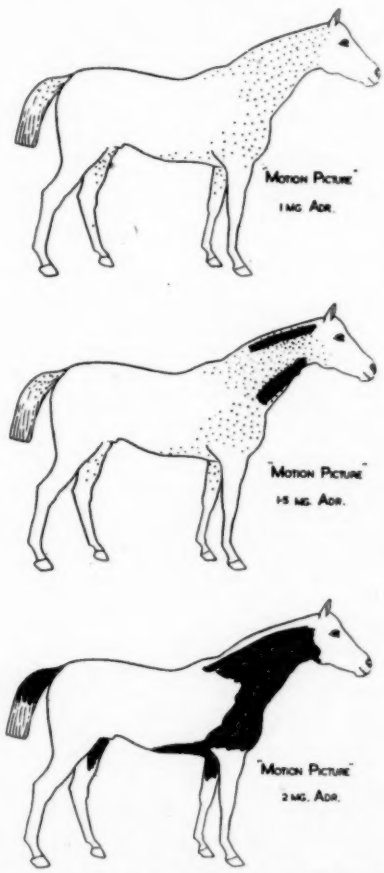


FIG. 4.—Response of less severe case. "Motion Picture," gelding, five years, three years in Malaya, dry two years. The sweating areas show no extension at larger doses, but merely an increase in amount of sweat.

when the injections were made over the ribs, towards the back. If the upper neck were used, even a nearly dry-coat horse usually gave some response.

The response to an intradermal injection of adrenaline into a free-sweater, was much as described for normal horses in England (Lovatt Evans & Smith, 1956): sweat appeared first over the injection site within a minute or two, then the central area tended to dry off, and was replaced by a ring of sweating skin about an inch in diameter; finally this ring tracked out in a clear-cut line running towards the thoracic opening or towards some large deep lymphatic vessel.

In the following table (Table III) are shown the results of injections into the flanks of 25 race-horses, some free-sweaters, some dry or practically dry. Fig. 5 (*overleaf*) illustrates the actual results in five typical cases, two free-sweaters, the other three dry. The distinction between free-sweaters and dry-coat horses seems conclusive, the former responding, as in England, with local sweating, and usually with tracking, with concentrations down to 10^{-6}, while the latter did not respond to concentrations of 10^{-5}, most of them not to 10^{-4} and some not even to 10^{-3}. This description, however, applies to the results of injections into the rib and back area, not to the neck. If injections are made into the neck area, as in "Young Clem" (Bowden) (Fig. 5), a long-standing and very dry case, typical local sweating with tracking may result with adrenaline 10^{-3}, or weaker.

Discussion

The results of some of the experiments are not as clear-cut as might have been wished. This is especially so with the estimations of blood adrenaline before and after exercise. These experiments were perhaps too ambitious, and it is quite possible that some sources of error were incapable of detection or elimination. Noradrenaline results have been recorded, but as their significance is not known, they can be left out from this discussion.

The absolute resting levels of adrenaline and noradrenaline were higher in Malaya, for all types of horses, than for the hunters examined in England. The adrenaline values for the horses in England (Evans, Smith & Weil-Malherbe, 1956) averaged 1·69 μg. per litre (range 1·10 to 4·04), and those in Malaya averaged 2·9 μg. per litre (range 1·11 to 5·45) in the case of free-sweaters, and 3·18 μg. per litre (range 1·44 to 5·13) for the dry coats. Comparing English horses with Malayan free-sweaters, $t = 3{\cdot}96$ and $P < 0{\cdot}01$, while the comparison of English horses with Malaya dry coats gives $t = 4{\cdot}69$ and $P < 0{\cdot}01$: in both cases the difference between the adrenaline content of the bloods in Malaya and in England is highly significant. There is no significant difference between the free-sweaters and dry coats in Malaya ($t = 0{\cdot}44$; $P > 0{\cdot}5$). It is concluded, therefore, that in Malaya all horses, free-sweating or dry-coated, have resting plasma adrenaline levels higher than those in England. It may well be that a discharge of adrenaline is one of the normal responses to a hot moist environment, and the higher levels of adrenaline found in Malaya, together with the results of the analyses of the adrenals, seem to dispose of the question as to whether the failure to sweat may be due to reduction of adrenaline production. It definitely cannot be due to that.

A further interesting point is that the average resting level of adrenaline in the blood of the two types of horses in Malaya, *viz.*, 2·9 and 3·18 μg. per litre is not

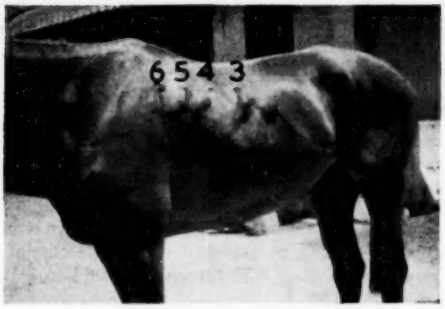
TABLE III

I.D. INJECTION OF 0.05 ML. ADRENALINE INTO RIB AREA

Date	Horse	Sweater or Dry*	Concentration of Adrenaline injected			
			10^{-6}	10^{-5}	10^{-4}	10^{-3}
May 1955	"Sudan"	F.S.	++. T	++. T	+++. T	++++. T
" "	"Maori Chief"	F.S.	++. T	+++. T	+++. T	++++. T
" "	"Clear Vision"	F.S.	+	++. T	++. T	+++. T
June 1955	"Maori Chief"	F.S.	++	++. T	+++. T	++++. T
" "	"Magic Eye"	F.S.	+++. T	++++. T	++++. T	++++. T
" "	"Gold Town"	F.S.	+++	++++. T	++++. T	++++. T
" "	"Epsom"	F.S.	++++. T	++++. T	++++. T	++++. T
" "	"Skyrider"	P.D.	—	—	+	++
" "	"Bicordi"	P.D.	—	—	—	++
May 1955	"Asholme"	P.D.	—	—	—	+
" "	"Ryegrass"	P.D.	—	—	—	—
" "	"Linkshir"	D.	—	—	—	—
" "	"Greet"	D.	—	—	—	—
" "	"Fair Sir"	D.	—	—	—	—
" "	"Stealth"	D.	—	—	—	—
" "	"Red Wolf"	D.	—	—	—	—
" "	"What Happened" ...	V.D.	—	—	—	—
" "	"Dendrite"	V.D.	—	—	—	—
June 1955	"Young Alec"	D.	—	—	—	—
" "	"Granderen"	D.	—	—	—	—
" "	"Buck Rebel"	D.	—	—	+	+
" "	"Fancy Light"	D.	—	—	++?	—
" "	"Bougainvillea"	D.	—	—	—	—
" "	"Preview"	D.	—	—	—	—
" "	"Kabaka"	V.D.	—	—	—	—

*F.S. Free sweater.
P.D. Partially dry.
D. Dry coat.
V.D. Very dry.

+ = detectable sweat
++++ = very free sweat
T = tracking
— = no sweat

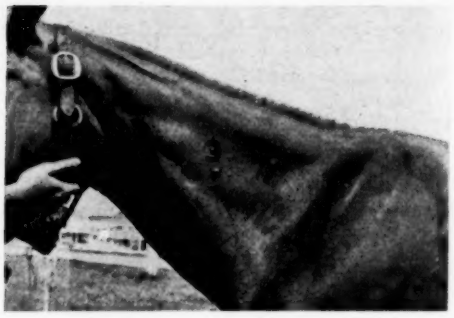


"SUDAN"

"CLEAR VISION"

"FAIR SIR"

"RYEGRASS"



"YOUNG CLEM"

FIG. 5.—The four figures on the left show the results of intradermal injections of adrenaline into rib area at concentrations, from left to right, of 10^{-6}, 10^{-5}, 10^{-4}, and 10^{-3}. "Sudan" and "Clear Vision" were free sweaters, and show tracking lines. "Fair Sir" and "Ryegrass" were dry coats; the injection blebs are visible, but there was no response. The lowest figure, "Young Clem" (courtesy of R. S. T. Bowden) shows that even a confirmed dry coat can show sweating and tracking when 10^{-3} adrenaline is given intradermally in the neck region.

much below the average level, as raised by exercise, of horses in England (3·45 μg. per litre) and individual values for resting dry coats and some free-sweaters are even higher. This offers further evidence, therefore, that in Malaya the sweat glands of both types are less responsive to adrenaline than in England.

The responses to exercise were not strictly similar to those in England. This may in part be due to differences in the exercise itself. In England, normal hunters, without exception, showed an increase averaging 1·09 μg. per litre in blood adrenaline after exercise. The Malayan samples from free-sweaters showed an increase, sometimes a large one, in seven cases out of nine, but in the other two cases there was a fall; the increases in adrenaline averaged 1·54 μg. per litre and were statistically assessed as marginally significant.

The dry-coat horses gave less satisfactory results. The resting levels of adrenaline (and noradrenaline) were usually slightly higher than in the Malayan free-sweaters, and, as usual, there was a close correlation between the adrenaline and noradrenaline. On exercise the non-sweaters showed an average increase of blood adrenaline of only 0·86 μg. per litre, but the results were very irregular, since five out of 13 showed a fall and one a large rise. Statistically, the increase was not significant. The meaning of the results of these experiments is therefore doubtful. They could be interpreted to mean that adrenaline utilisation often outstripped production, that the increase of adrenaline concentration is inadequate in any case to excite the sweat glands, and that the instances of large increases, *e.g.*, horses D and "Scottish Minstrel," were due to some untraced source of error. Or, if we accept the figures as correct, then the explanation could be that the response of the sweat glands to adrenaline is very greatly depressed.

The observations on the effects of intravenous and intradermal injections of adrenaline give support to the latter view, since they show beyond all doubt that doses of adrenaline which give a response in normal horses in England or free-sweaters in Malaya, give a much smaller response in dry-coat horses. It is perhaps significant that even the free-sweating horses in Malaya appear to be somewhat less sensitive to adrenaline than do normal horses in England.

It is interesting to note that the order in which various areas go dry stands in rough inverse relationship to the amounts of sweat they normally produce, and the promptness with which it appears, under the stimulus of exercise or of a given dose of adrenaline. Thus, the perineal and neck areas sweat most promptly and profusely and are among the last to go dry : *complete* absence of response to adrenaline over the whole body has not been encountered. The parts that show the change in response most clearly are those that normally sweat little, *e.g.*, the thigh, croup and back.

If we may agree that the state of dry coat is immediately due to reduced responsiveness to adrenaline on the part of the sweat glands, we may now consider how the condition comes about. It could be explained as due to an accommodation of the sweat glands to adrenaline whereby this loses its potency. The state of anhidrosis is usually preceded by profuse sweating lasting for many hours, *e.g.*, during the passage of imported horses through the Red Sea, or in horses returned to sea level after a curative change of climate. Such an accommodative alteration of excitability is a commonplace physiological experience. In this case, the prolonged preliminary period of sweating is no doubt a response to altered climatic conditions which cause, or threaten to cause, a rise in body temperature. Sweating is normally caused in the horse by the action of adrenaline, and the liberation of adrenaline must be one of the effects produced by a rise of body temperature. Its effects may be imitated in a temperate climate by the intradermal administration of adrenaline, which, especially if repeated, leads to a state of local anhidrosis lasting for some days. We saw also, in the experiments on " Pasamora " and " What Happened " that an intravenous administration of adrenaline converted a partial dry-coat condition into a complete general anhidrosis which lasted for two weeks. Horses in Malaya do seem, according to our results, to have, even when at rest, a blood adrenaline comparable with that which would cause profuse sweating in a temperate climate, and to this, or even higher levels, the sweat glands of the dry-coat horses have become insensitive and will remain thus in a " refractory state " so long as they are exposed to these conditions. On removal to a more temperate climate, the condition may gradually be overcome, and the normal excitability of the glands restored, at least for as long as the temperate conditions prevail.

Whether such a suspension of function of the sweat glands is accompanied by demonstrable histological changes in the sweat glands cannot yet be stated. It is quite probable that no profound histological changes can be demonstrated in such glands as can still be caused to secrete when presented with higher concentrations of adrenaline than those to which they are now regularly exposed ; such might be the case with the glands of the neck, for instance. But with glands that have long been dry and which do not respond to adrenaline in any reasonable amounts, it would be surprising if some changes, of the nature of disuse atrophy were not demonstrable ; such glands would be expected to be found especially in the rib, back and croup areas.

We are not here concerned with treatment for the condition, but there seems little prospect of any line of treatment being of much value except that of removal to cooler conditions. Prevention, by way of air-conditioned stables where relative humidity is reduced, would seem to be preferable. Lowering of temperature should also help by increasing cooling by radiation and convection, so reducing the load on the sweat glands.

Summary

The adrenaline content of the blood of horses in Malaya is significantly higher than that of horses in summer in England, where such a level would cause sweating. The state of dry coat is preceded by a period of profuse sweating. Dry-coat horses are less sensitive to adrenaline than are free-sweaters. The condition of anhidrosis can be precipitated or aggravated by intravenous adrenaline injections.

It is concluded that the state of dry coat in horses is a consequence of prolonged stimulation of the sweat glands by adrenaline, secreted as a response to conditions of hot moist climate. The sweat glands become accommodated to the raised adrenaline content of the blood, so becoming insensitive to it. This creates a vicious circle, only to be broken by rest in a cooler and less humid climate.

Acknowledgments.—The authors wish to thank Mr. S. Calloway, of C.D.E.E., Porton, for statistical examinations of the results, R. S. T. Bowden, M.R.C.V.S., of the Veterinary Research Institute, Ipoh, Malaya, for the photo of " Young Clem " in Fig. 5, and for some preliminary observations and introductions, and Dr. G. B. West, of the School of Pharmacy, London, W.C., for the analyses of horse adrenals. They would also express their thanks to the owners and trainers who have co-operated throughout the investigation.

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HORNLESS AYRSHIRE CALF

Described by the county live-stock officer as most unusual, and the first case of its kind in Cheshire, a six-week-old pedigree Ayrshire, " Minstrel Lilac IV," was born without horns. The owners believe this calf be to the first natural poll Ayrshire calf in this country—certainly it is the first in their experience. The county live-stock officer has known of one previous case, but there was some doubt about the parentage of the animal. He believed there had been about five cases of poll Friesians in the last 15 years.

Legal Pitfalls of Veterinary Practice

BY
CHARLES STEVENS

II.—Trespass

TRESPASS may be trespass to the person, trespass to land or trespass to goods. It is unlikely that the veterinary surgeon would indulge in trespass to the person such as assault or battery, and the number of occasions on which he would commit trespass to land in his professional career are few. Normally, when the veterinary surgeon visits a client, there is an implied invitation to go on to his premises for the purpose of diagnosis and treatment of his animals. He has no right at law, however, to enter land or premises without permission express or implied, and any unjustifiable interference with the possession of land, even walking across it without permission, is a trespass which could give rise to a civil action. These two trespasses are relatively unimportant, but the third form of trespass, trespass to goods, is one that may easily be committed by the veterinary surgeon, often without the realisation that a civil wrong is being done.

Trespass to goods is defined as wrongful interference with the possession of them, and may take many forms such as damaging a client's property—for example scratching a client's car if in the veterinary surgeon's yard—or injuring or destroying goods. All that is necessary is that direct harm should be done to the goods and it is probably unnecessary for actual physical contact to take place. A long succession of decided cases has shown, for example, that chasing cattle is a recognised trespass, and it is as much a trespass to a neighbour's horse or beast to scare it off his land as to put a halter on it and lead it off. Some hundred years or so ago it was the law that a trespasser to goods of another was liable whether his act was intentional or merely negligent. It is doubtful to-day whether mere negligence would give rise to an action for trespass, but it is better to err on the side of safety and make sure no trespass is committed.

There is an important difference between whether an action is brought for trespass or for negligence. Pecuniary damages can be claimed in a case of trespass irrespective of the amount of actual damage sustained, whereas in cases of negligence the legal damages are usually based on an assessment of the actual damage suffered. There is a case on record where the trespass was accidental and involuntary without any element of negligence and in that instance the defendant was successful.

The veterinary surgeon might well say to himself after reading the foregoing that he is not likely to commit trespass, and that a claim against him on that score is something he need not guard against. In point of fact a number of claims arising out of trespass are considered by the Mutual Defence Society every year and it is proposed to quote, anonymously, details of some of these to show how even the most careful veterinary surgeon can become involved in liability.

In one case a dog was brought to a veterinary surgeon for removal of a toe and the wrong toe was removed. This could either be negligence in that the veterinary surgeon had not done his work properly, or it could be trespass in that he had interfered with his client's goods by cutting off a toe that the client had given him no authority to remove. The client sued in trespass because the dog was no worse for removal of the toe, and therefore if the claim had been in negligence little if any damages would have been recovered. There was defence to trespass, however, and a substantial sum was involved.

In another instance a horse was under treatment by a veterinary surgeon for colic, and through no fault of the veterinarian the horse died. Subsequently, and without the authority of the owner of the horse, the carcase was sent to a knacker, and the owner maintained it was not the man he would have chosen, adding that a sum of several pounds less than he had expected had been received. This was trespass because it was unjustifiable interference with the owner's possession of the horse, and the veterinary surgeon had to make up the difference between the sum actually received and that which the owner thought he should have received.

A serious case of trespass occurred when a kitten was brought to a small-animal practitioner for castration and was destroyed in error. The kitten was of little real value, but the client complained that the trespass had caused great emotional upset, and a sum had to be paid out of all proportion to the true value of the goods trespassed against.

A veterinary surgeon called in to see a dog which would not eat found that the cause was a diseased molar tooth. The maidservant was the only person on the premises. The veterinary surgeon, without the permission of the owner or the owner's agent, anaesthetised the dog to remove the tooth. The dog died before recovery from anaesthesia. A case of trespass was brought with resultant heavy damages.

In another case a heifer was seven months in pregnancy and this had not been diagnosed by the veterinary surgeon. Without the owner's knowledge or consent he injected stilboestrol and as a result the heifer aborted within a few days. Because no consent was given it was a trespass, and although undoubtedly the trespass was unintentional, the element of negligence arising from the non-diagnosis of the pregnancy made it actionable at law and a claim for a considerable amount had to be settled.

The foregoing examples show that the veterinary surgeon runs a considerable legal risk when dealing with other people's animals in that the law guards jealously a person's rights in his goods. In all cases of doubt the veterinary surgeon should obtain clear instructions from the owner and clear permission to do anything that might be construed in law as a trespass.

In Brief

RUMINANT DIGESTION

IT is now firmly established that all foodstuffs entering the reticulum and rumen are attacked by the bacteria or by the protozoa that live in these organs.

Cellulose, starch and glucose, on fermentation by rumen bacteria, yield principally acetic and propionic acids (Elsden, 1945). Rations rich in starch result in the accumulation of high concentrations of lactic acid in the rumen (Phillipson, 1952). Hemicelluloses are also attacked in the rumen (Marshall, 1949). Degradation of protein is also responsible for a part of the fatty acid mixture present in the rumen (McDonald, 1952). The rate of initial hydrolysis of protein appears to vary with different protein feeds, so far as can be judged by the concentrations of ammonia appearing in the rumen of sheep. Groundnut meal causes high concentrations of ammonia while herring meals, in comparable amounts, produce lower concentrations. The addition of starch depresses the concentration of ammonia present (Annison, Chalmers, Marshall & Synge, 1954).

Deaminative attack of amino-acids in the rumen is rapid, ammonia and a mixture of short-chain fatty acids being produced together with carbon dioxide (el-Shazly, 1952a, b; Warner, 1955). As with carbohydrates, the acids formed in greatest quantity are acetic and propionic but C^4 and C^5 acids are also produced in both straight and branched forms, and these are characteristic of protein degradation in the rumen (Annison, 1954). Grazing sheep and cattle on young summer grass have high concentrations of ammonia in the rumen liquor (McDonald, 1522; Head & Rook, 1955).

The soluble products of bacterial fermentation are interesting from several points of view; firstly, the production and absorption of large quantities of ammonia in the rumen (McDonald, 1948) may mean that the protein of the feed is not being used economically for productive purposes (Chalmers & Synge, 1954b). Secondly, there is the possibility of excessive ammonia production causing ill effects in the animal. Urea is known to be hydrolysed rapidly, and urea poisoning when excessive quantities are given is known to occur although the symptomology does not appear to be due to uncomplicated ammonia poisoning (Clark, Oyaert & Quin, 1951).

The introduction of propionate and glycerol, which is fermented to propionate, as therapeutic agents for the treatment of ketosis in cattle seems rational and success has been claimed (Johnson, 1953). Propionate is an important source of glycogen in ruminants, as the available evidence suggests that comparatively little glucose is absorbed from the alimentary tract (Schambye, 1951), but there is no evidence yet to suppose that cattle suffering from ketosis do not produce adequate propionate in the rumen. The alternative explanation, offered by Shaw (1956), that the pituitary-adrenal mechanism is disturbed suggests that metabolism of fatty acids may be distorted.

There is some evidence to suppose that low butterfat values, which may occur in cattle feeding a low roughage ration or on fresh green crops, are due to change in the proportion of acids present in the rumen (Balch *et al.*, 1955): too little acetic and too much C^3 acids have been postulated as a possible cause.

The two conditions mentioned indicate that disturbances in metabolism of the ruminant have to be studied in relation to the peculiarities in digestion of these animals.

A. T. PHILLIPSON (November, 1955).

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THE ANIMAL HEALTH TRUST

A new scheme to enable fatstock producers to contribute towards the running costs of the Animal Health Trust's Farm Live-stock Research Station at Stock, Essex, was introduced on January 1st. Arranged in co-operation with the National Farmers' Union, the Fatstock Marketing Corporation, and the Live-stock Auctioneers' Market Committee for England and Wales, the scheme follows much the same lines as that run successfully for some years by the Milk Marketing Board, under which regular agreed deductions for transmission to the Trust are made by producers.

In commending the scheme, Sir James Turner, President of the N.F.U., has said:—

"The valuable work of the Trust is widely known. Since it was founded in 1942 it has gained for itself a record of solid achievement and progress. Research in animal health problems is not an intellectual exercise where the findings are of restricted and academic interest. It is an essential requirement which is constantly yielding practical results in the interests of practical husbandry."

The Art of Dressage*

BY
K. MORANT
Shenley

THERE is a misconception amongst riding people and others that the object of dressage is to prepare horses for dressage tests. This is entirely wrong; one does not learn to read and write in order to take part in examinations; examinations are a test of the progress made and it is the same with dressage tests.

A definition of dressage, according to Henry Wynmalen, M.F.H., is the art of improving one's horse beyond the stage of plain usefulness, of making him more amenable, easier to control, more pleasant to ride, more graceful in his bearing, and better to look upon.

I do not propose to say anything about High School or the Classical School of Vienna as this is an art in itself and there are very few people who can produce a horse up to this standard.

In order to improve your horse you have to try to ride better—which will probably entail lengthening your stirrups. Then, by relaxing, you can sink down deeper in the saddle. Being lunged without stirrups or reins improves your balance enormously. Once you have achieved a deep seat you will become one with your horse, and it is quite extraordinary how much better your horse will go when you no longer disturb the rhythm of his gait. The ease of the seat makes you independent of any need to find support from the reins, so you have independence of hands and body and freedom of the lower legs.

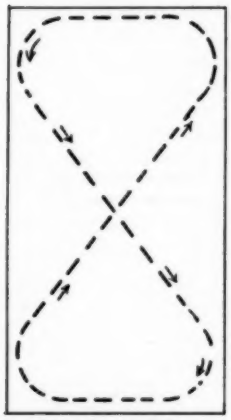
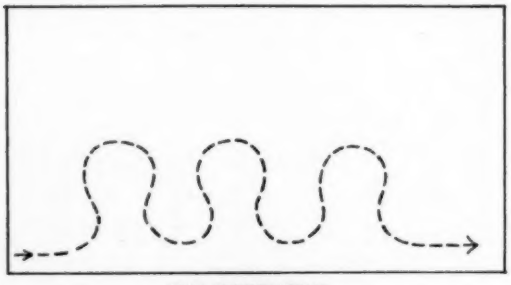


FIGURE OF EIGHT

Now something about the horse itself.



THE SERPENTINE

In training, the horse must never be allowed to "slop"; he must go freely forward and he must be active. There are various school movements such as changes of hand, counter-change of hand, circles,

HALF CIRCLE AND CHANGE

COUNTER CHANGE OF HAND

half-circle and change, serpentines and figures of eight; these are all very simple to do, but to be of real use they must be done correctly and with great care and precision.

When riding circles the hind legs must follow in the tracts of the fore-feet and the horse must always look in the direction in which he is going, *i.e.* if he is making a right-hand circle he must not be looking to the left. The only exception is in an exercise called "shoulder-in," which is purely a suppling movement. The exercises from the halt are the rein-back, turn on the forehand, and turn on the haunches. When opening and shutting gates these turns are most useful.

Next are the side-steps, full- and half-passes, which are very important both from a practical as well as a theoretical point of view. From the practical point of view you obtain complete control of the horse's quarters which means greater handiness, improved performance, and much increased safety. (The greatest difficulty in equitation is to keep the horse straight.) Handiness is important in that you can hold the horse exactly where you like, sidle him up to a gate, and hold him there while you open and shut it conveniently without undue effort. Additionally, you can ride through a wood of closely-planted trees without getting your knees rubbed, and you can manoeuvre through a crowd of horses without touching any of them and thus inviting kicks.

Improved performance arises from the fact that proper leg control is the only effective means of hold-

* A talk given to the Herts and Beds Division of the B.V.A.

ing a horse to his fences and preventing him from running out.

Safety, last but not least, means that you can, if the horse tends to shy, prevent him from so doing and landing you amongst traffic.

From the theoretical point of view this work improves the horse's collection, bearing, and suppleness. Miss Pat Smythe always uses elementary dressage for all her jumpers. " Flanagan " was originally trained by Brigadier Bolton as a combined training horse and competed at Badminton, and it can be assumed that this early training has done a lot in helping this horse to be so obedient to Miss Smythe.

Mr. Peter Robeson uses dressage for his jumpers, as does Mrs. Selwyn Butcher for her champion hacks; Mr. Hindley puts his champion hunters through novice dressage also.

Miss Sheila Wilcox, who won the European Three-Day Event Championship at Turin last year, was the first woman rider to win this very severe test of horsemanship. At the end of the first day she led, having beaten the foreign competitors at their own game, as with their indoor schools they specialise in dressage. Previously, at Basle, Miss Diana Mason at the end of the first day was also far ahead on marks over the foreign competitors.

In the Three-Day Event of the last Olympic Games it was interesting to note that the riders who were in the first places after the dressage practically all completed the very difficult and long cross-country course on the second day and gained bonus points. For instance the winner, Kastenman (Sweden), on " Illuster," started with 116.40 penalty points being, I think, fourth after the dressage day. I think also that the first 10 in the dressage completed the cross-country course and finished in the first 12 with one exception, the German, Rothe, who only had 98.40 penalty points, did come to grief in the cross-country and eventually finished 15th, but then there always must be exceptions to any example. Kastenman by supreme control of his horse gained 69.87 bonus points on the cross-country which was far in advance of any other rider. Our own Col. Weldon, who had 103.20 penalty points in dressage, gained 37.72 bonus points on the cross-country and eventually finished third.

Now we come to the tests themselves.

All tests are composed with the same object in view: to examine horses and riders pretty thoroughly in the short space of 7 to 15 minutes; in all their various paces and in some of the specific movements which are considered to correspond with the degree of their training. There are five classes: Novice, Elementary, Medium, Prix St. George, and Grand Prix or Olympic, and as their names imply they gradually increase in difficulty. I only mentioned the last two in passing.

These tests are divided into movements or groups of movements, and the marks awarded range from 0 to 10. Errors over the course are penalised by loss of marks—two for the first error, three for the second, and elimination for the third—there are also time faults, each test must be ridden inside a specified time and each second over that time costs a quarter of a mark. The use of the voice is not allowed, neither are whips.

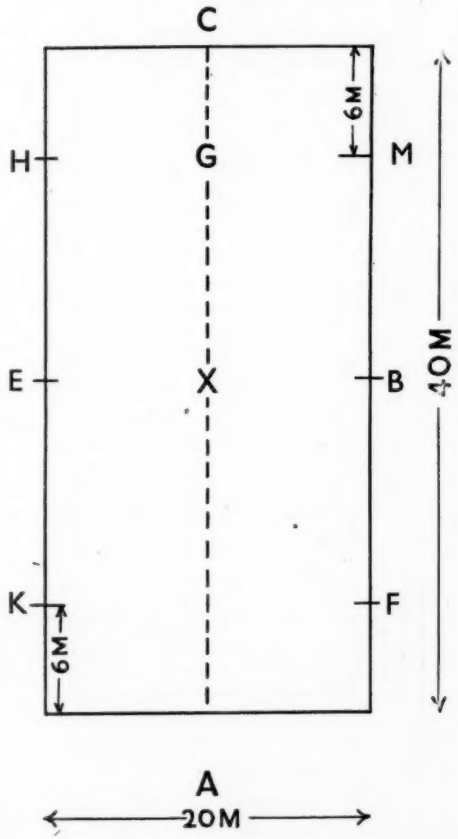
Novice and Elementary tests are ridden in an arena 20 by 40 metres with half-way and quarter markers at which various movements begin or end; there is also a centre line. The Elementary test has quarter lines parallel with the centre line because there is a serpentine to be performed at the canter without change of leg 5 metres each side of the centre line.

The Medium test has a large arena, 20 by 60 metres with five marks up the side. This test includes collected work at all paces, half passes, and both a halt and a walk from a canter.

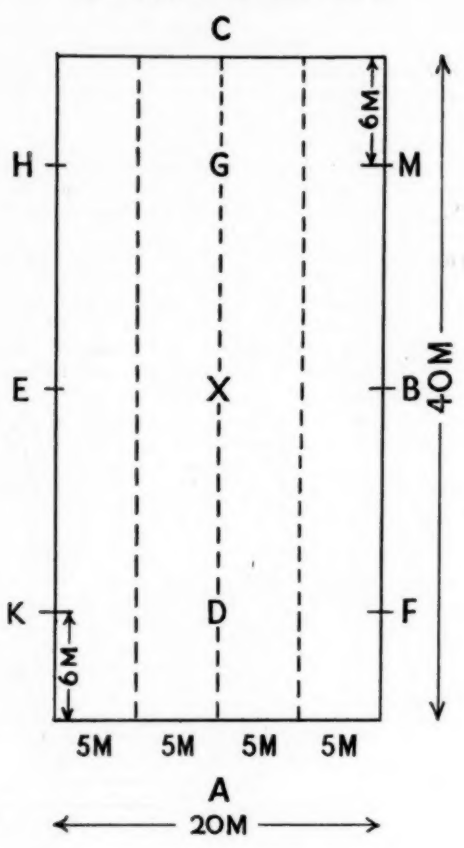
These tests provide an opportunity for those owning horses whose conformation is not good enough to win in the show ring to take part on equal terms as conformation does not count. The same applies to horses which are not sound enough to stand up to hunting or show jumping, and to their riders.

It is interesting to note that both Mrs. Lorna Johnstone and Mr. Wynmalen both advocate hunting for their horses; and Mr. Wynmalen, who is an M.F.H., used to hunt " Bascar," who was a very famous dressage horse.

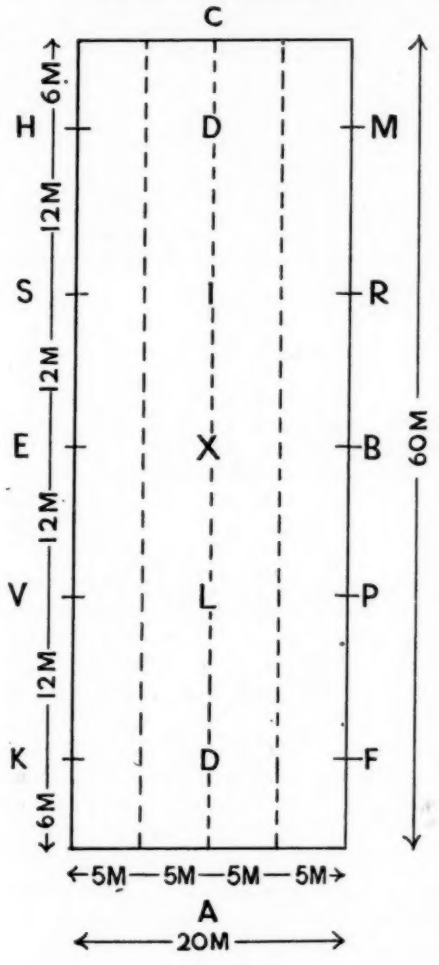
ARENA FOR NOVICE TEST



ARENA FOR ELEMENTARY TEST



ARENA FOR MEDIUM TEST



In this talk I have tried to show that dressage is not a lot of mumbo-jumbo, but that it can be put to practical use and anyone can do it. Like everything else it can, of course, be subject to abuse.

Acknowledgment.—I am grateful to Mr. R. A. Brown for advice on certain aspects of this talk.

References

British Horse Society (1955). "Notes on Dressage."
WYNMALEN, H. (1952). "Equitation." Country Life, London.
———. (1953). "Dressage." Museum Press, London.

THE COLONIAL VETERINARY SERVICE

The following promotions and new appointments are announced:—

Promotions

M. L. Burdin, Veterinary Research Officer, Kenya, to be Senior Veterinary Research Officer, Kenya; T. J. Coyle, Veterinary Officer, Uganda, to be Veterinary Research Officer, Uganda; R. M. Gambles, Senior Veterinary Research Officer, Federation of Nigeria, to be Principal of the Veterinary School, Federation of Nigeria; J. G. Ross, Veterinary Officer, Uganda, transfer, Veterinary Research Officer, Federation of Nigeria; W. M. Fitzsimmons, Veterinary Officer, Basutoland, transfer, Veterinary Research Officer, Nyasaland.

New appointments

A. W. Jukes, Veterinary Education Officer, Veterinary Department, Northern Nigeria; M. W. Smith, Veterinary Officer, Uganda.

THE ROYAL SOCIETY OF HEALTH

The Royal Society of Health announces that Fellowships have been conferred upon the following gentlemen in recognition of their work in the sphere of public health: Mr. P. W. Daykin, B.SC., M.R.C.V.S., Head of the Veterinary Division of C. J. Hewlett & Son, Watford; and Mr. J. M. Olivant, M.R.C.V.S., D.V.S.M., Lecturer in Applied Veterinary Pathology, Liverpool University.

Fracture of the Os Penis

BY
T. C. DENHOLM
Carlton, Notts

Subject

Sealyham terrier aged six weeks.

History

Repeated straining for 12 hours. Owner telephoned message to the effect that the puppy had a stoppage of the bowels. Examination revealed a grossly distended urinary bladder.

Diagnosis

Obstruction of the urethra.

Treatment

General anaesthesia was administered by intravenous pentobarbitone sodium.* An attempt was made to pass a cat catheter but this only travelled half-way along the length of the os penis. Very faint crepitus could be felt at this point. By careful manipulation the two fragments of bone were aligned and the catheter inserted a little further. Urine immediately commenced to flow but stopped when the catheter was withdrawn.

The puppy was of some considerable value and after discussion with the owner it was decided to perform urethrotomy. The ischial region was prepared and the urethra opened at this site. The wall of the urethra was reflected on each side and sutured (not without some difficulty on account of its size) to the skin, using very fine nylon. The puppy was returned to his kennel mates and a close watch kept on him. Urine was passed without difficulty through the ischial opening and the puppy appeared well and happy. The sutures were removed on the sixth day and the artificial orifice seemed to meet the puppy's needs.

Fourteen days after the operation the owner telephoned to say that the ischial opening had closed but that the puppy was passing urine normally. This was indeed the case and uneventful recovery took place.

This case was considered to be of sufficient interest to record on account of the rarity of the condition and of the extreme youth of the subject. The injury apparently occurred after a kennel maid had placed a board on edge across the front of the kennel, and it was assumed that the puppy had attempted to clamber over the obstacle.

* Nembutal.

THE VICTORIA VETERINARY BENEVOLENT FUND

The sum of £3 10s. kindly given to the Fund by the Final Year (December) students through Professor C. Formston is gratefully acknowledged.

Current Literature

BOOK REVIEW

Diseases of Cattle. Fifty-seven authors. American Veterinary Publications, Inc., Evanston, Illinois, U.S.A., 1956. pp. 752. Figs. 234.

The appearance of a new veterinary text-book, particularly one on clinical matters, is always of widespread interest to most veterinarians in the English-speaking world, and this one is a notable addition to veterinary literature.

The work, which is under the editorship of Professors M. G. Fincher, W. J. Gibbons, Karl Mayer and S. E. Park, is the result of the contributions of 57 authors. Many of their names will be familiar to British readers and some of them have earned an international reputation for their knowledge and experience of the subjects on which they write.

The first three chapters cover methods of physical and laboratory examinations and administration of medicines ; there follows a chapter on nutrition and another on diseases of calves. The next eight chapters are devoted to the abnormalities of the different anatomical systems and they are the best part of the book. There are also chapters on artificial insemination, toxicology, diseases due to physical causes, and diseases of metabolism. Chapter 23 is entitled " Miscellaneous and Unclassified Diseases," which includes information on the so-called mucosal disease, Q fever, and ulcerative stomatitis. Chapters 18, 19, 20 and 21 are devoted to bacterial, viral and protozoal infections.

Thus it will be seen that the work is comprehensive. The editors have had to face the old problem that presents itself to all producers of the comprehensive text-book ; this is, whether to concentrate its production in a few hands and, despite the risks of second-hand acquaintance with some of the material, achieve balance and some uniformity of presentation, or rely on a number of experts to present their own subjects and pay the inevitable price of unevenness. The editors have chosen the latter approach and they have paid the usual penalty of the omnibus book, the work of many pens. Allowing for the difference in emphasis which must be present in a book designed primarily for the American veterinarian, there are still some surprising variations in emphasis. For example, tuberculosis is dismissed in three pages, a page of which describes tuberculin tests including those historically interesting procedures known to our elders as the ophthalmic and subcutaneous tests. This reviewer felt that this sketchy description, perhaps, was a reflection of the low incidence of bovine tuberculosis in the U.S.A., and it was with some surprise that he then read an excellent account of rinderpest, a disease which has never been seen in North America, covering 10 pages and including some coloured plates illustrating the lesions. Incidentally, the production and format of the book are excellent and the clarity of the illustrations outstanding.

However, these inequalities were inevitable and they should not be allowed to outweigh the over-all value of a new text-book which will have a very definite appeal to the veterinarian in cattle practice. Most of their problems will be found within its pages, discussed in up-to-date terms and considered aetiologically along

broad lines. (It was refreshing to find that the article on mastitis included a clear description of the operation of the milking machine installation and methods of testing its efficiency.) Unfortunately, the cost of the book is considerable but it is an overhead which most country practices would be wise to incur.

ABSTRACTS

The Transmission of *Salmonella gallinarum* Through the Egg. JORDAN, F. T. W. (1956). *Poult. Sci.* **35.** 1019-25.

Salmonella gallinarum was isolated from 13 of 274 (5 per cent.) eggs laid by two birds that had recovered from fowl typhoid. In one case infected eggs were laid 19 and 24 months after recovery from the clinical disease. The examination of 65 eggs from two other recovered birds gave negative results. *S. gallinarum* was also isolated from 25 of 226 (11 per cent.) eggs laid by two birds that recovered from fowl typhoid following treatment with nitrofurazone.

More than half of all the infected eggs were laid within a month of the birds coming into lay. One bird showed a dual infection with *S. gallinarum* and *S. pullorum*.

The Anthelmintic Effect of Three Piperazine Derivatives on *Ascaridia galli* (Schrank, 1788). HORTON-SMITH, C., & LONG, P. L. (1956). *Poult. Sci.* **35.** 606-14.

The Treatment of Ascaridia *Infestations in Poultry with Piperazine Derivatives*

Piperazine adipate and piperazine carbon disulphide were 100 per cent. effective in removing adult *Ascaridia galli* from experimentally infected chickens when given in capsule form in doses of 200 mg. or more. Piperazine adipate and citrate were also very effective when given in the food at the rate of 300 mg. in 100 grammes of wet mash, or in the drinking water at the rate of 300 mg. per 200 ml. of water.

The three piperazine compounds removed a considerable number of *Ascaridia* larvae, but the extent to which the tissue phase larvae are removed has not yet been determined. The action of the piperazine compounds on *A. galli* appears to be similar to that described for other nematodes in that they produce a state of narcosis in the worms which are, then carried to the exterior by normal peristaltic movements.

The Effect of Nicarbazin on Reproduction in White Rock Breeder Hens. SHERWOOD, D. H., MILBY, T. T., & HIGGINS, W. A. (1956). *Poult. Sci.* **35.** 1014-19.

The Effect of Nicarbazin on Reproduction in Laying Hens

The use of 0.0125 per cent. of nicarbazin in the food slightly depressed egg production. When 0.07 per cent. was given, the birds ceased to lay in about 10 days, but resumed production within 10 days of returning to unmedicated food. In most of the treated birds the brown colour of the egg shells became partially bleached. The effect on fertility was not ascertained, but it was found that the hatchability was reduced by about 50 per cent. when 0.005 or 0.0125 per cent. of the drug was given. Most of this embryonic mortality occurred during the first week of incubation. The hatchability returned to normal within two weeks of a return to unmedicated food.

It appears that the use of nicarbazin in growing pullets has no effect on their subsequent production, but the authors suggest that such treatment should be discontinued one week before the onset of egg production.

The Efficiency of Nicarbazin as a Prophylactic Drug in Caecal Coccidiosis of Chickens. RUBIN, R., MCLOUGHLIN, D. K., COSTELLO, L. C., & WEHR, E. E. (1956). *Poult. Sci.* **35.** 856-60.

Nicarbazin for the Treatment of Caecal Coccidiosis

The authors report that nicarbazin given in the food at 0.0125 per cent. was highly effective against experimental infections with *Eimeria tenella*. Under the conditions of the experiments it was more effective than sulphaquinoxaline, 0.0125 per cent., or nitrofurazone, 0.0055 per cent. No toxic effects were found from the use of nicarbazin at this level, but higher levels appeared to be unpalatable. At 0.1 per cent. deaths occurred from apparent starvation, but there were no macroscopic or microscopic lesions that could be associated with the use of the drug.

E. A. G.

Studies on Infectious Atrophic Rhinitis. V.—Concept that Several Agents may cause Turbinate Atrophy. SWITZER, W. P. (1956). *Am. J. Vet. Res.* **17.** 64. 478-84.

There is a tendency to regard infectious atrophic rhinitis as being a specific infectious disease. The experiments in this paper were designed to show that turbinate atrophy may be caused by several unrelated agents. Since the critical factor in transmission appears to be the age of the inoculated pig, only piglets up to four days old were used, and the experiments were terminated between four and six weeks later.

Filtrates (through membranes of 0.5 to 0.75μ pore diameter) of some atrophic turbinate suspensions were capable of transmitting turbinate atrophy, and in some cases also produced pneumonia in the experimental pigs. Crude lung and turbinate suspensions treated with penicillin and thallous acetate reproduced turbinate atrophy and pneumonia, but terramycin appeared to inhibit the agent or agents present.

Pasteurella multocida and alcaligenes species were recovered from some atrophic turbinates and found capable of reproducing the disease. Trials with *Haemophilus suis* and *Ps. aeruginosa*, on the other hand, failed to reproduce the disease.

Investigating the possibility that prolonged irritation of the nasal cavity by non-infectious material might produce atrophy, trials were made on the effect of the repeated introduction of acetic acid into the nasal cavities. This treatment produced definite turbinate atrophy, but no pneumonia.

These various findings suggest that infectious atrophic rhinitis can no longer be considered as a specific disease.

I. W. J.

News and Comment

THE NEW YEAR HONOURS

The names of two members of the profession appear in the New Year Honours. They are Mr. W. G. Beaton, of the Inter-African Bureau of Epizootic Diseases, who is awarded the C.B.E., and Mr. A. Taylor, veterinary officer, of Uganda, who is awarded the M.B.E. Readers will also have read with pleasure that Sir Weldon Dalrymple-Champneys, a valued friend of the Association, has been raised to the Companionship of the Bath. Dr. J. F. Loutit, physicist, of the atomic research station at Harwell, who was co-author of a paper read at the Belfast Congress, receives the C.B.E.

CLASSIFIED ADVERTISEMENTS

May we draw the attention of readers to a chart, immediately following the classified advertisement section of this week's RECORD? It is hoped that this will form a useful " ready reckoner " for the cost of small advertisements according to the number of words used and the frequency of publication. It may be found useful to cut out the chart and keep it for reference.

THE REGISTER OF VETERINARY SURGEONS

The names of Mr. Sambhu Nath Nandi, 9, Hyat Khan Lane, Calcutta, India, and Mr. Francis Nesfield Andrewes, Lynton Grange, Fortis Green, London, N.2, have been restored to the Register of Veterinary Surgeons.

THE NATIONAL COURSING CLUB

Registration of Litters

Veterinary surgeons are asked, from time to time, to provide certificates indicating colour and sex of litters which are to be registered with the National Coursing Club. The Club issues a pamphlet upon which is printed " This pamphlet should be seen by the veterinary surgeon at the time of inspection " and its full wording is as follows:—

NATIONAL COURSING CLUB

11, Haymarket, London, S.W.1

REGISTRATION OF LITTERS

For the guidance of breeders, attention is drawn to the fact that when registering puppies *as a litter*, it is not necessary to include very small white markings in colour descriptions, and these should only be included where they are considerable, *e.g.* a brindled dog which has a white blaze on the chest and white toes only may be entered as brindled and not brindled and white.

In cases where the white markings appear elsewhere, however, and/or extend up the leg beyond the toes, they should be included in the colour description when entering them *as a litter*.

N.B. When *naming and transfer* forms are completed *all markings, however small,* must be shown on the diagrams.

Members of the profession who are asked to inspect litters and furnish certificates are advised to take note of the Club's requirements as set out above.

PETROL LIAISON OFFICERS

With regard to the list of liaison officers published on page 1055 in our issue of December 29th, 1956, our attention has been drawn to the fact that the telephone number for the Eastern region has been changed. It should be Cambridge 58691/2 and not as previously stated. That for the North Midland region is Whatton 328.

CONTENT OF " THE VETERINARY RECORD "

As one correspondent has remarked already, it is a pity that, among the recently published letters which have been critical of this journal, the majority have come from those not all of whose work has found favour with our scrutineers. A recent correspondent has even suggested that only " rejectees " are in a position to pass opinion; but however much such writers may strive after objectivity, they can scarcely do so effectively while smarting under a sense of grievance.

In one of the first letters it was suggested that very little of the content of this journal was of interest (or even intelligible) to the practitioner. Like all generalisations, this one collapses under considerations of fact. During 1956 a total of 198 papers was published. Of these, 52 were clinical, 33 were general, and 30, though not strictly clinical communications, were of importance to veterinary surgeons in practice. Thus, broadly speaking, *more* than half the published material—to say nothing of the news and correspondence—was devoted to matters of general, rather than of specialised interest. Yet, according to figures published not long ago in Hansard, the number of veterinary surgeons in private practice is *less* than half our readership.

A correspondent has suggested that we should be more active in " requesting " articles likely to be of general clinical interest. Was not this the very purpose of the William Hunting awards, announced at the beginning of 1956? In season and out we have urged clinicians to write papers, and only a few months ago, in order to spare them as much trouble as possible, medical and surgical questionnaire forms were prepared, the answers to which were to form the " raw material " of short papers to be written in the editorial office and passed for final approval to the clinicians concerned.

Of some 2,000 forms sent out, three have so far been completed. In these circumstances readers may understand why the suggestion to " request " more papers from members in practice drew from the Editor no more than a sigh.

The fact is that the average busy practitioner has too little time to write; that is understood and must be accepted. But it is fruitless for critics to gird at THE RECORD for failing to publish what is not received. We can only say yet again that good clinical material is eagerly sought after and is always most welcome.

Certain critics, it is true, have made the point that were we to publish everything offered, regardless of

quality, we should find ourselves well supplied. Once again the criticism does not hold water. Apart from the fact that a journal which publishes without discrimination neither commands nor deserves respect, the number of rejected papers in 1956 was about one in seven—and the larger proportion of these were scientific papers.

It must be added that the number of rejections would have been higher but for the work of scrutineers and of members of the Editorial Committee, who at times completely reconstructed, or even rewrote, papers which were of fundamental value but unacceptable in the form submitted. In sum, the number of authors who have benefited from the help and advice of scrutineers is many times greater than the number whose work has been, regretfully, returned.

Apart from general principles there have been certain detailed criticisms ranging from the suggestion that articles should be subject to literary but not to professional or scientific scrutiny, to others too irresponsible for serious consideration. It has been suggested, for example, that the Editor alone accepts or rejects manuscript. As most readers well know, this suggestion is completely wrong. The scrutineering system has been in use for decades past, and the panel of scrutineers includes senior clinicians as does the Editorial Committee. The same correspondent foretells the decline of this journal unless its practices are radically changed. Exactly the opposite is the case: THE RECORD receives, in these days, more offers of manuscript than ever in its history, and the number is increasing. Our critic then goes on to misread the Association's published accounts and attributes the entire salaries of the permanent staff to a single department. Having so done, he deduces that "there must be plenty of staff" and suggests further additions to it.

The real point at issue was posed by the correspondent who wrote: "We must be very clear in our minds as to whether THE RECORD is to become a type of senior college magazine or a scientific journal of international repute."

For so comparatively small an Association as the B.V.A. to produce the only weekly journal of its kind in the world, and to maintain it in a prosperous condition is a noteworthy feat whatever its shortcomings may be. Rather than lower our standards we should seek to raise them; for THE VETERINARY RECORD is a yardstick by which many outside our ranks judge the clinical capacity and scientific standing of the profession. The journal still has far to go; but the direction in which some of our correspondents have been pointing is not the right one.

NEW MEMBERS OF THE R.C.V.S.

The following ladies and gentlemen were admitted to membership of the Royal College of Veterinary Surgeons on the date shown against their names:—

BEECH, John Atkinson, 85, Talbot Road, Roundhay, Leeds, 8. December 11th, 1956, Edinburgh. B.SC. (EDIN.); BOUSFIELD, William Edward Doyle, Well Cottage, Goose Green, Broadbridge Heath, Sussex. December 11th, 1956, London; BROWN, Doris Dawson (Miss), 360, Holburn Street, Aberdeen. December 11th, 1956, Edinburgh. B.SC. (EDIN.).

CAMERON, Reginald Scott, c/o St. Giles House, The Terrace, Cheadle, Staffs. December 11th, 1956, London; COCKS, Edwin, Crabtree, Hamm Court, Weybridge, Surrey. December 11th, 1956, London.

DAVIES, Gwyneth Mary (Miss), 8, Green Lanes, West Ewell, Surrey. December 11th, 1956, London; DARGAN, Peter, Ballivor, Co. Meath, Eire. December 15th, 1956, Dublin; DEVEREUX, William Richard, Tomhaggard, Co. Wexford, Eire. December 15th, 1956, Dublin.

FALLON, Garrett Aidan John, Prospect House, Clavard, Wexford, Eire. December 15th, 1956, Dublin; FOGARTY, William Patrick, Marine Lodge, Taylor's Hill, Galway, Eire. December 15th, 1956, Dublin.

GILES, Harold Graham, Casita, Bassaleg, Newport, Mon. December 11th, 1956, London; GILL, Ernest Alfred, 19, Mount Pleasant Avenue, Harehills Lane, Leeds, 8. December 11th, 1956, London; GILL, Wali Mohammed, 42, Mulgrave Street, Liverpool. December 11th, 1956, London. B.V.SC. (PUNJAB.); GREENWOOD, Ronald, 60, Stanley Road, London, N.9. December 11th, 1956, London.

HOLLAND, William, 496, Hornsey Road, London, N.19. December 11th, 1956, London.

JONES, Colin Russell Verrier, Albion House, Oxford Street, Newbury, Berks. December 11th, 1956, London; JONES, John Salisbury Lloyd, 7, Clewer Court, Oakfield Road, Newport, Mon. December 11th, 1956, Edinburgh; JONES, Rowland Hewitt, 47, Heol Capel Ifan, Pont-y-beren, Nr. Llanelly, Carms. December 11th, 1956, London.

KELLY, John Anthony, Woodcocks, Bagby, Thirsk, Yorks. December 15th, 1956, Dublin; KETTLES, Andrew Sharp, 14, West Port Place, Cupar, Fife. December 11th, 1956, Edinburgh. B.SC. (EDIN.).

LIKAR, Ivan Nino, 109, Beecham Road, Reading, Berks. December 11th, 1956, London. DR. MED. VET. (VIENNA).

MCDOUGALL, George McGregor, Lissa, Main Street, Bonhill, Dunbartonshire. December 11th, 1956. Edinburgh. B.SC. (EDIN.); MCKIE, Esther May Coral Evelyn (Miss), 12, Heathfield Road, Acton, London, W.3. December 11th, 1956, London; MANGAN, Patrick Joseph, Skehana House, Crecora, Co. Limerick, Eire. December 15th, 1956, Dublin; MOORE, Timothy Elliott, Captain late R. A., Oakley Close, Elm Lane, Lower Earley, Reading, Berks. December 11th, 1956, Edinburgh; MURPHY, Patrick Aloysius, Slatt, Wolfhill, Athy, Leix, Eire. December 15th, 1956, Dublin.

NETTLETON, Lonsdale Brian, 94, Becketts Park Drive, Leeds, 6. December 11th, 1956, London.

OSMAN, bin Din, 60, Seberang Perak, Alor Star, Malaya. December 11th, 1956, London; O'DRISCOLL, John, Kilbrogan Hill, Bandon, Co. Cork, Eire. December 15th, 1956, Dublin; O'HARE, Michael Benedict, St. Annes, Tassagh, Armagh. December 15th, 1956, Dublin; O'MAHONEY, Jeremiah, Seafort, Schull, Co. Cork, Eire. December 15th, 1956, Dublin; O'NEILL, Jeremiah John, Mount Offaly, Athy, Co. Kildare, Eire. December 15th, 1956, Dublin; O'SULLIVAN, Dermot Columba, Paddock, Ricehill,

Cavan Town, Co. Cavan, Eire. December 15th, 1956, Dublin; O'SULLIVAN, Finbarr James, 31, Ulverton Road, Dalkey, Dublin. December 15th, 1956, Dublin.

PEARCE, James Sidney, 3, Westwood Avenue, Brentwood, Essex. December 11th, 1956, London.

RANDELL, George, c/o Taylor, 23, Munro Avenue, Kilmarnock, Ayrshire. December 12th, 1956, Glasgow; ROBBINS, Geoffrey Ralph, 11, Highfield Road, Woodford Bridge, Essex. December 11th, 1956, London; RUTHERFORD, Leonard Henzell, 157, Yarmouth Road, Lowestoft, Suffolk. December 11th, 1956, London.

SMITH, Philip James, 42, Walsall Road, Sutton Coldfield, Warwicks. December 11th, 1956, Edinburgh. B.SC. (EDIN.).

VOLRATH, John Peter, 50, Park Road, Hampton Hill, Hampton, Middlesex. December 11th, 1956, London.

WALLACE, James, Grove Hill, Bally, Ballymena, Co. Antrim. December 15th, 1956, Dublin, and WELLS, Bernard Thomas, 11, Morland Road, Ipswich, Suffolk. December 11th, 1956, London.

THE WORLD LIST

Those who make use of the World List of Scientific Periodicals may wish to note that a compendious list of amendments to the third edition of this work was published in *Chemistry and Industry* on November 3rd, 1956, pages 1,260-5.

R.C.V.S. EXAMINATIONS

Glasgow

Final Examination

Randell, George.

Edinburgh

Fourth Examination

Humphreys, Medwyn.

Final Examination

Beech, J. A.; Brown, Miss D. D.; Jones, J. S. L.; Kettles, A. S.; McDougall, G. M.; Moore, T. E., and Smith, P. J.

Dublin

Second Examination

Anatomy only: O'Driscoll, T. L.

Physiology only: Marray, E. A. (credit), and Wilkie, S. D.

Third Examination

Hygiene only: Barrett, J. N. (credit); Berry, J. P.; Corry, D. M. G.; Delahunty, D.; Dickson, H. P.; Dowling, W. A. (credit); Duignan, J. J.; Hannigan, J. H.; Holloway, A. B.; Keane, D. C.; Lynch, M. E.; Moloney, Richard; O'Brien, T. J. (credit); O'Reilly, D. J.; Phelan, N. P.; Sweetman, W. L.; Troutón, R. K. (credit); Walsh, John, and Wilson, R. W.

Pathology only: Carroll, Denis; Corcoran, M. P.; Downey, J. S.; Flanagan, J. P.; Hoban, G. P.; Johnston, J. B.; Kelleher, D. L.; Kelleher, J. F. L.; King, M. B.; McGovern, P. G.; May, D. J. (credit); Monaghan, M. G. B.; Osborne, Michael, and Sheahan, T. J.

Final Examination

Dargan, Peter; Devereux, W. R.; Fallan, G. A.; Fogarty, W. P.; Kelly, J. A.; Mangan, P. J.; Murphy, P. A.; O'Driscoll, John; O'Hare, M. B.; O'Mahony, Jeremiah; O'Neill, J. J.; O'Sullivan, D. C.; O'Sullivan, F. J., and Wallace, James.

MR. J. CAMPBELL HILL

A. G. B. writes:—

By the death of Mr. J. Campbell Hill, of Llanelly, South Wales, at the age of 85, the veterinary profession loses one of its oldest members.

Born in Glasgow, he was the youngest member of a family of 10. He was educated at Murchison's Grammar School, and at Glasgow High School. He qualified at Glasgow veterinary school in 1894. After a brief period as a locum tenens in the midlands, he settled in Llanelly in 1895, and retired only two years ago.

Among his other activities he held a part-time appointment as Veterinary Officer to the Borough of Llanelly, and this included the position of meat inspector. He was a keen advocate on the part the profession should play in meat inspection, and it was due to him that a satisfactory state of affairs was attained in Llanelly. On his retirement his partner in the practice succeeded him in this post.

In the limited space available, it would be impossible to give a full appreciation of Campbell Hill. He was interested in so many matters, veterinary and otherwise. In the veterinary field, however, he was known to many. Hardly a Congress went by without his attendance, together with his daughter, Mrs. B. Hill Owens. Their work for the Victoria Veterinary Benevolent Fund is so well known as to call for no elaboration.

He was a founder member, and Past-President of the South Wales Division of the B.V.A., the Welsh Branch, and the Society of Practising Veterinary Surgeons. For the latter he travelled many miles in order to gain the support of his brother practitioners.

During the First World War he joined the Glamorgan Yeomanry and was on active service until the end of hostilities. By then he had attained the rank of major.

His interest in Masonry was very wide; he was a Past-Master of many lodges in Carmarthenshire, and also became a Past-Provincial Grand Warden. He was an active member of the Llanelly A.F.C., but despite this, he often found time to attend rugby matches in the town. He was a great bowls enthusiast, and, indeed, could rightly be termed a great all-rounder. He took a close interest in all the affairs of the town, where he was held in high esteem.

His proudest record was the number of veterinary students who passed through his practice. He kept a careful record of all his 60 "boys." Many of us have to thank him for his guidance and for the helping hand he extended to us during those formative years. Among his many students and later friends was the late Dr. J. T. Edwards, and it was mainly through his efforts that the Dr. Edwards Memorial Fund was started. It is tragic that he did not live

to see the final result of this endeavour which meant so much to him.

Mr. Campbell Hill suffered a great deal in the closing months of a life devoted to his profession. It was typical of him too, that he requested he should be laid to rest with the minimum amount of ceremony. Because of this only a few close professional friends attended the funeral. He never sought publicity, but nevertheless he will long be remembered for the work he did for his profession throughout his long life.

He leaves a daughter (Mrs. B. Hill Owens) and a son. Our deepest sympathy is extended to them in their great loss.

PERSONAL

Births

GOURLAY.—On December 17th, 1956, to Doreen, wife of R. Nigel Gourlay, B.SC., M.R.C.V.S., Animal Health Research Centre, Entebbe, Uganda, a daughter, Alison Jane.

JESSOP.—On December 21st, 1956, to Iris, wife of Lewis Jessop, of Henley Cottage, Drury Lane, Redmarley, Gloucestershire, a daughter, Ann.

SMITH.—On December 28th, 1956, to June, wife of V. W. Smith, B.SC., M.R.C.V.S., at Shrewsbury, a son, Roger.

Marriage

HOWAT—BLACKWELL.—On December 19th, 1956, at St. Michael's Church, Ford, Nr. Shrewsbury, William Park Howat, M.R.C.V.S., of Strathaven, Scotland, to Mavis Blackwell, B.V.SC., M.R.C.V.S., of Romiley, Cheshire. Both formerly with R. P. Parsonage, M.R.C.V.S., of Shrewsbury.

R.C.V.S. OBITUARY

We record with regret the deaths of the following members of the profession:—

HILL, John Campbell, Trimley, Ty'rfran Avenue, Llanelly, Carms., Capt. R.A.V.C. (T.F.) (Retd.). Graduated Glasgow, December 18th, 1894. Died December 14th, 1956, aged 85 years.

SOUTAR, John James Macfarlane, C.B.E., 6, Greyfriars Garden, St. Andrews, Fife, Brigadier late A.V.S. Graduated Edinburgh, January 23rd, 1910. Died December 16th, 1956, aged 67 years.

COMING EVENTS

January

7th (Mon.). 18th Ordinary General Meeting of the A.V.T. & R.W's. at the Animal Diseases Research Association, Moredun Institute, Gilmerton, Edinburgh, 9, 10 a.m.

24th (Thurs.). Annual Dinner and Dance of the V.V.B.F. (Northern Division) in the Northern Hotel, Aberdeen, 7.30 p.m.

February

1st (Fri.). Annual General Meeting of the Mid-West Veterinary Association at the Berkeley Café, 2.30 p.m.

21st (Thurs.). Annual Ball of the Royal (Dick) School of Veterinary Studies in the Assembly Rooms, George Street, Edinburgh, 8.30 p.m.

BRITISH VETERINARY ASSOCIATION QUARTERLY MEETINGS

Wednesday, January 23rd, 1957, at 7, Mansfield Street, W.1.

10.00 a.m. Parliamentary and Public Relations Committee.
11.30 a.m. Veterinary State Medicine Committee.
2.00 p.m. Small-Animals Committee.

Thursday, January 24th, 1957, at 7, Mansfield Street, W.1.

10.00 a.m. Farm Live-stock Committee.
11.30 a.m. Home Appointments Committee.
12.30 p.m. Finance Sub-committee.
2.30 p.m. General Purposes and Finance Committee.

Friday, January 25th, 1957, Connaught Rooms, Great Queen Street, W.C.2.

10.30 a.m. Extraordinary General Meeting followed by Council Meeting.

FOOT-AND-MOUTH DISEASE

The areas described in the schedule below are declared to be Infected Areas for the purpose of preventing the spread of foot-and-mouth disease:—

IN THE COUNTY OF WEST SUSSEX

The Boroughs of Arundel, Chichester and Worthing.

The Petty Sessional Division of Arundel.

In the Petty Sessional Division of Chichester: The parishes of Singleton, East Dean, Up Waltham, Eartham, Boxgrove, Westhampnett, Tangmere, Aldingbourne, Oving, Berstead, Bognor, Middleton-on-Sea, Pagham, North Mundham, Hunston, Donnington, Appledram, Birdham, West Itchenor, West Wittering, East Wittering, Earnley, Sidlesham and Selsey and so much of the parish of Lavant as lies to the east of the main road (A.286) running from West Dean to Chichester including the said road.

In the Petty Sessional Division of Petworth: The parishes of East Lavington, Duncton, Barlavington, Sutton, Bignor, Bury, Coldwaltham and Parham and so much of the parish of Fittleworth as lies to the south of the railway running from Selham to Pulborough excluding the said railway.

In the Petty Sessional Division of Steyning: The parishes of Storrington and Sullington and so much of the parish of Washington as lies to the south of the main road (A.283) running from Storrington to Steyning including the said road.

In the Petty Sessional Division of Worthing: The parishes of Clapham and Findon.

The County Borough of Hastings.

IN THE COUNTY OF EAST SUSSEX

The Boroughs of Bexhill and Rye.

In the Petty Sessional Division of Rye: The parishes of Northiam, Beckley, Brede, Guestling, Fairlight, Pett, Icklesham, Udimore, Peasmarsh, Rye Foreign and Playden and so much of the parish of Iden as lies to the west of the road (B.2082) running from Wittersham to Playden excluding the said road.

In the Petty Sessional Division of Battle: The parishes of Mountfield, Ewhurst, Whatlington, Sedlescombe, Battle, Westfield, Crowhurst, Catsfield, Ore, and Penhurst and so much of the parish of Brightling as lies to the south of the road (B.2096) running from Dallington to Netherfield including the said road.

In the Petty Sessional Division of Burwash: The parishes of Hurst Green, Salehurst and Bodiam.

IN THE COUNTY OF WILTS

The Boroughs of Malmesbury and Swindon.

In the Petty Sessional Division of Cricklade: The parishes of Marston Mevsey, Latton, Ashton Keynes, Leigh, Cricklade, Purton, Braydon, Lydiard Millicent, Lydiard Tregoze, Wootton Bassett, Tockenham and Lyneham.

In the Petty Sessional Division of Swindon: The parishes of Blunsdon St. Andrew and Haydon Wick.

In the Petty Sessional Division of Malmesbury: The parishes of Crudwell, Oaksey, Hankerton, Charlton, Minety, Brokenborough, Malmesbury, Lea and Cleverton, Norton, St. Paul Malmesbury Without, Little Somerford, Brinkworth, Easton Grey, Sherston, Hullavington, Great Somerford and Dauntsey.

In the Petty Sessional Division of Chippenham: The parishes of Stanton St. Quintin, Sutton Benger and Christian Malford.

IN THE COUNTY OF GLOUCESTER

The Petty Sessional Divisions of Dursley, Whitminster, Berkeley and Wotton under Edge.

In the Petty Sessional Division of Stroud: The parishes of Rodborough, Pitchcombe, Whiteshill, Stroud, Thrupp, Woodchester and Nailsworth and so much of the parish of Horsley as lies to the west of the main road (A46) running from Nailsworth via Barton End to its junction with the main road (A4135) including the said road.

The parishes of Bisley with Lypiatt, Chalford, Minchinhampton and so much of the parish of Horsley as lies to the east of the main road (A46) running from Nailsworth via Barton End to its junction with the main road (A4135) excluding the said road.

In the Petty Sessional Division of Tetbury: The parishes of Kingscote, Boxwell with Leighterton and Didmarton.

The parishes of Avening, Cherington, Ashley, Tetbury, Beverston, Tetbury Upton, Westonbirt with Lasborough, Shipton Moyne and Long Newnton.

In the Petty Sessional Division of Sodbury: The parish of Wickwar.

In Petty Sessional Division of Thornbury: The parishes of Hill, Rockhampton, Falfield, Tytherington, Thornbury and Oldbury-upon-Severn.

In the Petty Sessional Division of Gloucester: The parishes of Harescombe, Brookthorpe, Quedgeley and Elmore.

In the Petty Sessional Division of Fairford: The parishes of Poulton and Maiseyhampton.

In the Petty Sessional Division of Cirencester: The parishes of Edgeworth, Duntisbourne Rouse, Bagendon, Baunton, Daglingworth, Ampney Crucis, Ampney St. Mary, Ampney St. Peter, Preston, Cirencester, Coates, Sapperton, Rodmarton, Kemble, Siddington, Driffield, Down Ampney, South Cerney, Somerford Keynes and Pool Keynes.

IN THE COUNTY OF NORFOLK

The City and County Borough of Norwich.

The County Borough of Great Yarmouth.

The Petty Sessional Division of Loddon and Clavering.

In the Petty Sessional Division of Blofield and Walsham: The parishes of Thorpe St. Andrew, Plumstead Great and Little, Postwick, Blofield, Brundall, Hemblington, South Walsham, Upton with Fishley, Acle, Burlingham, Strumpshaw, Beighton, Cantley, Halvergate, Reedham and Freethorpe.

In the Petty Sessional Division of East and West Flegg: The parishes of Ashby with Oby, Fleggburgh, Mautby and Stokesby with Herringby.

In the Petty Sessional Division of Taverham: The parishes of Trowse with Newton, Kirby Bedon, Bixley, Caistor St. Edmund and Stoke Holy Cross.

In the Petty Sessional Division of Depwade: The parishes of Swainsthorpe, Shotesham, Saxlingham Nethergate and Hempnall.

In the Petty Sessional Division of Earsham: The parishes of Denton and Earsham.

IN THE COUNTY OF EAST SUFFOLK

The Boroughs of Lowestoft and Beccles.

The Petty Sessional Division of Beccles.

In the Petty Sessional Division of Mutford and Lothingland: The parishes of Burgh Castle, Bradwell, Hopton-on-Sea, Belton, Fritton, Herringfleet, Ashby, Lound, Somerleyton, Blundeston, Corton, Flixton, Oulton, Carlton Colville, Barnby and Mutford.

In the Petty Sessional Division of Bungay: The parishes of Mettingham, Bungay, Ilketshall St. John, Ilketshall St. Andrew, Ilketshall St. Lawrence, Ilketshall St. Margaret, St. Peter South Elmham, St. Michael South Elmham and Flixton.

The Foot-and-Mouth Disease Infected Area around Ford, West Sussex, has been contracted to the following area which will cease to be an Infected Area for the purpose of preventing the spread of foot-and-mouth disease on January 11th, 1957:—

IN THE COUNTY OF WEST SUSSEX

The Borough of Arundel.

In the Petty Sessional Division of Chichester: The parishes of Eartham, Aldingbourne, Bersted, Bognor and Middleton-on-Sea.

In the Petty Sessional Division of Arundel: The parishes of Slindon, Madehurst, Houghton, South Stoke, Burpham, Walberton, Tortington, Lyminster, Poling, Warningcamp, Angmering, Eastergate, Barnham, Yapton, Ford, Wick, Climping, Littlehampton, Rustington, East Preston and Kingston and so much of the parish of Amberley as lies to the south of the road (B.2139) running from Houghton to Storrington including the said road.

The areas described in the schedules below will cease to be Infected Areas for the purpose of preventing the spread of foot-and-mouth disease on January 7th, 1957:—

IN THE COUNTY OF ESSEX

The Borough of Maldon.

In the Petty Sessional Division of Dengie and Maldon: The parishes of Bradwell-on-Sea, Tillingham, Dengie, Southminster, Burnham, Asheldham, St. Lawrence, Steeple, Mayland, Althorne, Latchingdon and Mundon and so much of the parishes of Hazeleigh and Purleigh as lies to the east of the railway line running from Maldon to Woodham Ferrers excluding the said railway line.

IN THE COUNTY OF KENT

The Borough of Tenterden.

In the Petty Sessional Division of Ashford: The parishes of Woodchurch, Shadoxhurst, Ruckinge, Orlestone, Brenzett, Kenardington, Appledore, Snargate, Stone cum Ebony, Brookland, Wittersham and Warehorne.

In the Petty Sessional Division of Cranbrook and Tenterden: The parish of High Halden.

IN THE COUNTY OF EAST SUSSEX

In the Petty Sessional Division of Rye: So much of the parish of Iden as lies to the east of the road (B.2082) running from Wittersham to Playden including the said road.

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Derby. Old Hall Farm, Roston, Ashbourne (Dec. 24).

Renfrew. North Mains Farm, Johnstone (Dec. 24).

Salop. Rodington House, Rodington, Shrewsbury (Dec. 27).

Fowl Pest

Beds. Pickner, Mount Pleasant, Kensworth (Dec. 24).

Bucks. 1, Swanbourne Road, Shipton, Bletchley (Dec. 22).

Essex. Wield Banes Farm, Debden Green, Saffron Walden (Dec. 20).

Herts. 7, Holding, Royston Road, Baldock (Dec. 24); Valley Farm. Flaunden Lane, Hemel Hempstead (Dec. 27).

Lancs. Laburnam House, 180, Southport Road, Scarisbrick; Denewood Poultry Farm, Mere Brow, Tarleton; Brookside Farm, St. Michaels, Preston (Dec. 20); Briars Farm, Eaves, Woodplumpton; Meadowcroft, Goosnargh; Willow House Farm, Woodplumpton (Dec. 21); Rabys Farm, Bilsborrow; Crow Wood House Farm, Burnley; Hallnook Farm, South Road, Bretherton; Barton Old Hall, Jepps Lane, Barton; Pewter House, Balderstone, Blackburn; Ryburn, Churchtown; Parkers Farm, Grange Lane, Hutton (Dec. 22); Pointer Farm, Stalmine, Fleetwood; Toad Hole Farm, Inskip; Cleggs Farm, Grange Lane, Hutton; Moons Farm, Woodplumpton (Dec. 24); Mosses Farm, South Road, Bretherton (Dec. 25); Glenesk, Skip Lane, Hutton; 65, Poulton Old Road, Blackpool; Shap Fell, Ratten Lane, Hutton; Higher Parkhead Farm, Myerscough; Stoney Lane Farm, Goosnargh (Dec. 26); Harwood Poultry Farm, Marshes Lane, Mere Brow, Tarleton; High Trees, Longsight Road, Clayton-le-Dale, Blackburn (Dec. 27).

Leics. Poplars Farm, Sheepy Magna, Atherstone (Dec. 24).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Thanks and Farewell

Sir,—As I am leaving the service of the R.S.P.C.A. on December 31st I would like to express to you most grateful thanks for the courtesy you have always extended to us. May I also express to my many friends in the veterinary profession most grateful thanks for all their help: instances of this come to one's notice daily and one can but express appreciation of the courage that many veterinary surgeons show in giving evidence against their own clients in cases of animal neglect, but that is the high standard that one would expect from the profession. As for their general assistance to people in poor circumstances, both through our clinics and in individual practices, we have only just received another example of this in that one veterinary surgeon is undertaking himself to pay the quarantine expenses of a refugee dog from Hungary. He is doing this without the slightest hesitation although it is bound to involve him in considerable expense: the Society has made it known that it will defray the whole cost in the case of animals belonging to Hungarian refugees, but it is more than encouraging to know that members of the profession were to the fore in this matter.

My successor is Mr. John Hall, the present Legal Secretary, and I am sure that you will give him the same support and courtesy that has been extended to the Society in past years.

Yours faithfully,

ARTHUR W. MOSS,
Chief Secretary.

Royal Society for the Prevention of Cruelty to Animals,
105, Jermyn Street,
London, S.W.1.
December 29th, 1956.